

REMARKS

The present Amendment is in response to the Examiner's Office Action mailed February 8, 2007. Claims 10 has been previously cancelled, claims 1, 5, and 8 are amended. Claims 1-9, and 12-21 remain pending in view of the amendments and remarks herein.

Please note that the following remarks are not intended to be an exhaustive enumeration of the distinctions between any cited references and the claimed invention. Further the remarks or lack of remarks here are not an admission regarding the Examiner's assertions in the Office Action. Rather, the distinctions identified and discussed below are presented solely by way of example to illustrate some of the differences between the claimed invention and the cited references. Reconsideration of the application is respectfully requested in view of the above amendments to the claims and the following remarks.

Claim Objections

The Office Action objected to claim 5 for an informality. Claim 5 has been amended as required by the Examiner.

Rejection Under 35 U.S.C. §102

The Examiner rejects claims 1-2 and 5-6 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,995,529 (*Kurtz*). Because *Kurtz* does not teach or suggest each and every element of the rejected claims, Applicants respectfully traverse this rejection in view of the following remarks.

Claim 1 has been amended to recite forming an active region over the substrate, the active region having a plurality of quantum wells. Claim 1 then recites growing a tunnel junction . . . over the active region.

In contrast, the layers of *Kurtz* referenced by the Office Action are located inside of the active region. *Kurtz* teaches, for example, that "the active region 14 further comprises a semimetal region 16 formed about a heterojunction between a pair of dissimilar semimetal-forming semiconductor layers, 18 and 20, and at least one quantum-well layer 22." See col. 2, lls. 61-64.

In other words, *Kurtz* teaches a semimetal region 16 formed inside of the active region while claim 1 requires growing a tunnel junction over the active region. Because the semimetal region 16 is inside of the active region, *Kurtz* cannot anticipate a claim where requiring a tunnel junction grown over the active region.

Further, *Kurtz* teaches that "No tunnel junctions are used in the infrared light source of the present invention." See col. 2, lls. 13-15. Claim 1, in contrast, requires growing a tunnel junction. Because claim 1 requires growing a tunnel junction and *Kurtz* teaches that "no tunnel junctions are used", *Kurtz* teaches away from claim 1.

For at least these reasons, Applicants respectfully submit that claim 1 is not anticipated by the cited art and is in condition for allowance. The dependent claims 2 and 5-6 are not taught or suggested by *Kurtz* for at least the same reasons.

Rejection Under 35 U.S.C. § 103

The Office Action rejected claims 3-4 under 35 U.S.C. § 103(a) as being unpatentable over *Kurtz* in view of U.S. Patent No. 5,349,201 (*Stanchina*)

Claim 7 is rejected as being unpatentable over *Kurtz* in view of EP0715357.

Claims 8-9 and 11 are rejected as being unpatentable over U.S. Publication No. 2003/0032252 (*Pan*).

Claims 12 is rejected as being unpatentable over *Pan* in view of 2004/0104403 (*Moll*).

Applicants respectfully submit that claims 3-4 and 7 are in condition for allowance at least because claim 1 is believed to be allowable as discussed above.

Applicants submit that claim 8 is not obvious in view of *Pan* for several reasons. First, claim 8 has been amended to require "a p-doped $\text{GaAs}_{(1-x)}\text{Sb}_x$ layer, wherein x is set at a value such that the p-doped $\text{GaAs}_{(1-x)}\text{Sb}_x$ layer is substantially lattice matched with an InP based active region and has a strain less than 1.95%".

As noted in the specification, AIAs on InP often has strain of about 3.55%. The use of $\text{GaAs}_{(1-x)}\text{Sb}_x$ with an InP based active region has less strain. In fact, $\text{GaAs}_{(1-x)}\text{Sb}_x$ is lattice matched when $x = 0.5$.

In contrast to the elements of claim 8, which are directed to a tunnel junction, *Pan*, is directed to a bipolar transistor. Because bipolar transistors are not typically

designed to be light emitters, bipolar transistors do not have a corresponding active region. In fact, *Pan* is silent as to an active region in light emitters. Applicant notes that the emitter of a bipolar transistor is different from a light emitter such as a VCSEL. As a result, *Pan* does not teach a p-doped layer that . . . is substantially lattice matched with an InP based active region. An InP based active region, in fact, is not found in the bipolar transistor taught by *Pan*

Further, *Pan* is silent as to selecting a value of x such that the strain is less than 1.95%. *Pan* contains no teachings regarding a p-doped layer that is substantially lattice matched with an InP based active region and a strain less than 1.95%.

For at least these reasons, Applicants respectfully submit that claim 8 is patentable over *Pan*. Because claim 8 is patentable, claims 9, 11, and 12 are also believed to be patentable over the cited art.

Allowed Subject Matter

The Examiner's allowance of claims 13-21 is appreciated. Applicants wish to thank the Examiner for the careful review and allowance of those claims.

The Applicant's submit the following comments concerning the Examiner's statements of reasons for the indication of allowable subject matter in the Office Action. Applicant agrees with the Examiner that the claimed invention of claims 13-21 is patentable over the prior art. However, Applicant submits that it is the claim as a whole, rather than any particular limitation, that makes each of the claims allowable. No single limitation should be construed as the reason for allowance of a claim because it is each of the elements of the claim that makes it allowable. Therefore, Applicant's do not concede that the reasons for allowable subject matter given by the Examiner are the only reasons that make, or would make, the claims allowable and do not make any admission or concession concerning the Examiner's statement in the Office Action.

Conclusion

In view of the foregoing, Applicants believe the claims as amended are in allowable form. In the event that the Examiner finds remaining impediment to a prompt allowance of this application that may be clarified through a telephone interview, or which may be overcome by an Examiner's Amendment, the Examiner is requested to contact the undersigned attorney.

Dated this 8th day of June, 2007.

Respectfully submitted,

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